vapor, that would produce a rain of more than thirty inches per annum all over the earth, must annually pass out past the earth in order to supply fuel to be dissociated by the heat that annually passes the earth; and why we can see the stars, although most of the solar radiations are absorbed within some reasonable distance of the sun."

It can be hardly looked on as a strong answer to the first question, that "the gases, being for the most part hydrogen and hydrogen compounds, have a low specific gravity as compared with the denser gases forming the permanent solar atmosphere. On flashing into flame in the photosphere, their specific gravity would be vastly diminished, thus giving rise to a certain rebound action, which, coupled with their acquired onward motion and with the centrifugal impulse they receive by frictional contact with the lower atmosphere, constitutes them a surface-stream flowing from the polar to the equatorial regions, and thence into space." It is certainly hard to understand why the atmosphere of any member of the solar system should not be made up of the gases of interplanetary space in the same proportions in which they may exist in such space, if there is the free circulation called for by Siemens' theory.

Faye objects that the presence of such a resisting medium in space as the vapors is not to be accepted, with our present knowledge, and that the centrifugal force at the sun's equator is far too small for the action required.

Hirn, starting with the supposition that the sun's temperature is 20,000° C., writes, that, although the dissociated gases might unite in the chromosphere, they would, on passing down through the sun's atmosphere, be again dissociated, and absorb as much heat as they had given out on combining. To this, Siemens might have answered that the gases would again combine on passing off at the equator.

The discussion of the theory at the time of its first statement was most earnest; but, in spite of the ingenuity displayed in its elaboration, it as yet cannot be accepted as probable.

INSPIRED SCIENCE.

Eureka; or, The golden door ajar, the mysteries of the world mysteriously revealed. By ASA T. GREEN. Cincinnati, *Collins*, 1883. 141 p., portr., cuts. 16°.

THE publisher acts as editor of this book, interspersing his own chapters among the author's in an odd fashion. The florid periods of the one form a curious setting for the rough, ungrammatical language of the other.

The author has 'revelations' of a 'wonderful knowledge' which he obtained, partly in the woods, and partly in Oil City, and desires to impart them to scientific men. We will offer them a bit.

"If we would lay a telegraph-wire down down (*sic*) from every point of the earth, and of water, and all points telegraph at one time to a given point, the result would be to find that the atmosphere was going as fast as the earth, and the earth as fast as the atmosphere. *Thus you see* it is the atmosphere that carries the earth around. . . .

"Third reason why the earth is round; namely, because the mountains are up. If the earth was flat, the mountains would be just as liable to be down as up, but as the curvature of the earth is up, hence the mountains are up. . . .

"If sound travels by vibration, as science teaches, and science teaches that vibration creates heat, that if a cricket should stand on one end of a solid slab-stone and rub his wings together, why is it that the vibration with the particles of stone does not completely melt the stone in ten minutes? I deny the hypothesis."

'Wonderful knowledge,' indeed!

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

MATHEMATICS.

Points of inflection. — Let $U = x^\alpha y^\beta z^\gamma + ku^\delta = 0$ be an equation in homogeneous co-ordinates; x, y, z, are the sides of the triangle of reference, and $u = ax + by + cz$; α, β, γ, δ, are integers such that $\alpha + \beta + \gamma = \delta$; a, b, c, are given quantities, and k a variable parameter. For $\alpha = \beta = \gamma = 1$, this equation gives a system of cubics having, as is well known, their points of inflection distributed by threes upon three right lines; viz., the three real points of inflection upon u, and the remaining six points, in threes, upon two imaginary lines.

The author, M. A. Legoux, proposes to consider the general case of curves of the order δ. The three sides of the triangle of reference are tangents to all the curves of the system in the points where these sides meet the line u. The order of contact is $\delta - 1$: if δ is even, the curve in the neighborhood of the point of contact lies on one side of the tangent; if δ is odd, the curve here cuts the tangent, giving a point of inflection of a higher order. M. Legoux shows that the proposed curves have imaginary points of inflection, which are distributed upon two conjugate imaginary right lines which are independent of the value of k. If δ is even, there are no other inflections; but, if δ is

odd, there exist three real points of inflection upon the line u, so that in the last case there exists, as in the case of cubics, an inflectional triangle. — (*Nouv. ann. math.*, Feb.) T. C. [105

ENGINEERING.

Electric-lighting machines on shipboard. — More than a dozen of the steamers plying between New York and Liverpool are fitted up with electric-lighting machinery. Probably three times as many are so fitted out on the various other lines of ocean-going steamships. The British steamers are largely supplied with the Siemens and Swan apparatus, but the other systems are well represented. The electric-light apparatus of the Arizona consists of two Siemens compound dynamos, each sufficient to supply current to three hundred high-resistance Swan lamps. They are driven by a pair of 'Caledonian' engines of nine and a half inch cylinders and fourteen inches stroke of piston. The two machines are mounted upon a common foundation, and are set in such manner that the driving-pulleys do not interfere with each other. The belts are tightened by moving the machines away from each other; they are formed of one continuous rope carried around each pulley ten times. Both cabins, and the steerage as well, are lighted by these machines. — (*Engineering*, May.) R. H. T. [106

New engine for electric-lighting. — Mr. E. D. Farcot has designed a new form of compound engine for electric-lighting machinery. It consists of two cylinders, the larger set above the smaller. The space between the two pistons is undivided, and is in communication with the interior of the engine-frame, and is never put in connection with the steam-supply pipe. The steam first enters the small cylinder, and is thence exhausted into the large cylinder, thus driving the pistons, which are both on a single rod, in opposite directions by a system of intermitted expansion. The engine is thus seen to be of the 'Wolff system.' The space between the two pistons is made to communicate with the larger space in the frame, merely to secure a reduced variation of uncounterbalanced pressure. No stuffing-box is needed in this engine in any inaccessible part of the machine. The valve-gear is of the plainest possible description, and the whole engine is built with a view to simplicity and small cost in construction and operation. It is intended to be driven up to four hundred revolutions per minute. — (*Publication industrielle*, May.) R. H. T. [107

Steam-jackets for steam-engines. — Herr Heim reports to the German society of engineers the results of experiments to determine the economy to be derived by the addition of steam-jackets to various forms of steam-engine. He finds that a six-horse power portable engine, unjacketed, demanded an excess of thirty-five per cent over the theoretical quantity of steam that should have been required to do the work; an eighteen inch Wheelock engine required the same excess over the calculated quantity. Both were non-condensing. Condensing-engines experience a still greater loss due to internal 'cylinder condensation.' Engines expanding ten times demand seventy-four per cent excess; when cutting off at one-fifth, sixty-two per cent; and expanding three times, fifty-five per cent more than the calculated amount when they are unjacketed. By adding a jacket, he concludes that the loss can be reduced to sixty-four, fifty-four, and forty-eight per cent. The effect of increase of piston speed is similar to that of adding a jacket. An engine at three feet, and at seven feet piston speed per second, gave a record of loss amounting to ninety-six and seventy per cent. The addition of the condenser causes increase of this loss. A twenty-inch non-condensing engine, working at five atmospheres pressure, was provided with a condenser, and, while the power was increased one hundred and forty per cent, the waste was increased from forty-two to sixty-two per cent. A hoisting-engine, working intermittently, exhibited a loss of a hundred and forty-two per cent of the weight of steam utilized. — (*Mechanics*, June.) R. H. T. [108

AGRICULTURE.

The gases evolved during the conversion of grass into hay. — In a series of experiments on this subject, conducted by Dr. P. F. Frankland and Mr. F. Jordan, freshly-cut grass in quantities of five grams each was allowed to stand in a glass tube over mercury. The glass tube was filled with air, inert gases, and experiments were also performed *in vacuo*. In air all the oxygen was absorbed at the end of three days, and 46% of carbonic dioxide was evolved. At the end of thirty days the percentage of carbonic dioxide reached 85.33, requiring a corresponding amount of oxygen, which must have come from the substance of the grass itself. Nearly pure carbonic dioxide was evolved in an atmosphere of the same gas, and a higher percentage seemed to be given off in darkness than in sunlight, although the authors were somewhat in doubt on this point. In an atmosphere of pure oxygen, the latter was absorbed completely in seven days, and the evolution of nitrogen ceased when the oxygen disappeared. When the experiment was conducted in an atmosphere of hydrogen, 21.11% of this gas was replaced by carbonic dioxide at the end of three days. It thus appears that certain constituents of the grass undergo a rapid process of oxidation, and that nitrogen is evolved as long as the atmosphere contains free oxygen. The decomposition-products of grass, when allowed to stand under water, were also examined. The grass was first soaked in distilled water, and the dissolved air removed with a Sprengel pump. Carbonic dioxide formed about 90 %, and hydrogen about 9 %, of the gases collected at the end of thirty days. No gas was evolved when the formation of bacteria was prevented by the addition to the water of phenol or mercuric chloride. As the other products of the fermentation, acetic and lactic acids, and probably propionic acid, were identified. — (*Journ. chem. soc.*, June, 1883.) C. F. M. [109

Absorption of moisture by soils. — Fisher finds that, contrary to Knop's statement, the amount of hygroscopic moisture retained by a soil varies greatly with the amount of moisture present in the air, as

well as with the temperature. At temperatures ranging approximately from 20° to 30° C., about half as much water was retained in a half-saturated as in a saturated atmosphere. As the temperature was raised, more water was absorbed from the saturated atmosphere, but less from the half-saturated one. — (*Rep. Cal. college agr.*, 1882, 52.) H. P. A. [110

Influence of organic manures on temperature of soil. — In experiments on this subject, F. Wagner finds that organic manures raise the temperature of the soil to an extent increasing with the quantity of the manure, the temperature of the soil, and its moisture, so long as the latter is not in such excess as to hinder access of oxygen to the organic matter, or to cool the soil too much by its evaporation. Porosity and ready decomposability on the part of the manure favor the action. The increase of temperature is greatest at first, may continue from four to twelve or more weeks, but under practical conditions is too small to be of much significance. — (*Forsch. agr. phys.*, v. 373.) H. P. A. [111

Moisture of the soil. — In pot-experiments with peat, Heinrich obtained the largest crop when the peat contained sixty per cent of the total quantity of water which it was capable of containing. Earlier experiment by Hellriegel on sandy soil gave nearly the same results. When the moisture of the peat fell below twenty per cent of its water-capacity, no crop was obtained, while in case of sand a small crop was obtained when the moisture was only ten per cent of the total water-capacity. — (*Bied. centr.-blatt.*, xii. 109.) H. P. A. [112

GEOLOGY.

Lithology.

Cleopatra's Needle. — In a paper by Dr. P. Frazer is given a description of some thin sections of the New-York obelisk, made by Prof. A. Stelzner of Freiberg, accompanied by four lithographic plates. The rock is composed of fresh microcline, showing in polarized light its characteristic grating; oligoclase, somewhat decomposed, and showing fine twinning striation; quartz in grains and granular aggregates, containing fluid cavities, trichites, and hematite plates; light green hornblende with irregular outlines; biotite in large brown, translucent scales; titanite in numerous small yellowish-red grains; water-clear acicular apatite crystals; magnetite in opaque irregular grains and in octahedrons; minute zircon crystals; yellowish-green needles of epidote and viridite. A granite from Germantown was regarded as similar to the Syene granite. The former is composed of microcline, plagioclase, quartz, hornblende, biotite, muscovite, titanite, etc. Frazer gives the literature of the subject. — (*Trans. Amer. inst. min. eng., Boston meeting.*) M. E. W. [113

Journalistic lithology. — A weekly journal was established last year in England on the peculiar plan of publishing descriptions of microscopic slides, with figures of the same, while duplicates of the described preparations were to be sent to every subscriber. This method, if under the direction of competent specialists, would serve as a valuable means of home training for those who are unable to place themselves under the direct instruction of competent teachers. It promised twenty-six histological, eighteen botanical, and eight lithological sections a year.

The lithological descriptions, so far, have embraced the following rocks: pikrite, dolerite, diabase, red and white syenite, and serpentine, with some bibliographical lists. While the journal contains some matter of interest to lithologists, it is, on the whole, a disappointing and unsafe guide for a student. In some cases the style of the lowest grade of 'popular scientific lecturers' has been adopted; and the phrase 'plugs of exosmotic transference,' used for veins, is too good to be lost. — (*Studies in microscopical science, London*, 1882–83.) M. E. W. [114

METEOROLOGY.

Sun-spots. — At the university observatory at Rome on 269 days in 1881, and 290 in 1882, Tacchini has made observations of sun-spots. He shows that in 1882 there was an increase in spots over 1881. The mean daily number by months was, in 1881, 19.55, and, in 1882, 22.57. There were peculiar maxima in the number in April and November, 1882. Taking each period of constant activity in the daily observations in 1882, a second maximum and minimum period appears at the half sun's rotation. For the faculae we also find that the increase is less with the growth of the spots; the yearly mean in 1881 being 88.36, and, in 1882, 81.55. It is believed from the character of the sun's activity at the last maximum period, as compared with the present, that the maximum spottedness will occur in 1883. — (*Naturforscher*, May 12.) H. A. H. [115

PHYSICAL GEOGRAPHY.

Artesian wells in Algeria. — In the south of the province of Constantine, Algeria, the boring of artesian wells, begun in 1856, was continued with renewed activity, after the interruption occasioned by the Franco-Prussian war, under the direction of M. Jus. At the end of 1879 the long line of wells following the Wady Rir, between Biskra and Tugurt, included 434 sunk by the Arabs, and yielding 64,000 litres a minute, and 68 bored by the French, yielding 113,000 litres. In the same decade, the number of palm-trees in the oases had increased from 359,000 to 517,000; of fruit-trees, from 40,000 to 90,000; of inhabitants, from 6,672 to 12,827. During the first half of 1880, twelve new wells were bored, yielding 22,000 litres, and, at the end of 1881, the total supply of water from these underground sources was 209,000 litres a minute. — (J. J. Clamageran, *Rev. géogr. internat.*, 1883, 43.) [116

Currents of the Pacific Ocean. — Antisell discusses the general motion of the warm currents of the western and northern Pacific, brings together a number of data not before correlated, illustrates them by maps and diagrams, and comes to the conclusion that, 1°, the warming influence of the North Pacific is the Kurosiwo, the motor power of which is the south-west monsoon, blowing from April to October; and, 2°, that the North Pacific Ocean has practically

no northern outlet, Bering Strait affording no real access for ocean-currents into the Arctic Ocean. — (*Bull. Amer. geogr. soc.*, ii. 1883.) W. H. D. [117

The Connecticut River in the glacial period. — Professor J. D. Dana continues his studies on the former lines of flow of the flooded Connecticut at the end of the ice time, and finds evidence, from the height and coarseness of the terraces, that some of the river's waters found their way southward along the Farmington valley (where the Farmington River now runs northward), down the upper course of the Quinnipiac, and thence directly southward along the present Mill River channel, to the Sound at New Haven, and not all the way along the Quinnipiac, as was formerly supposed. — (*Amer. journ. sc.*, xxv. 1883, 440.) W. M. D. [118

GEOGRAPHY.

(*Asia.*)

New Guinea. — A ten-days' trip inland from Port Moresby, made by W. G. Lawes and two others, with a party of natives, led them over the Veriata Mountain, about two thousand feet high, and up the valley of the Laloke River. From the mountain-summit, they had a fine view of sea and coast, hill and valley, intersected by many winding streams. In the valley, they visited the Rouna Falls, — about two hundred and fifty feet in height, and a hundred and fifty feet wide. The travellers saw many of the natives of the Koiari tribes, and found them all friendly and honest. They are smaller, darker, and more hairy than the coast tribes, and it was not uncommon to find a man with beard and mustache. They have a superstitious belief, that, when a man dies, he has been bewitched by a spirit belonging to a neighboring tribe, who then must pay for the loss: fighting, therefore, always follows the death of a man of any consequence. Fruit is very plentiful and in great variety. Salt is highly prized, and makes a very acceptable present. The native method of getting fire is peculiar: a piece of dry, pithy wood is split a little way, and held open with a stone; some tinder is put in the cleft, and a strip of rattan or bamboo is passed through it, and then pulled rapidly one way and the other till smoke and fire appear. In the 'Sogere' district, the villages consist of only eight or ten houses, and two or three 'tree-houses' which serve as forts. The occupants prepare for an attack by carrying up a supply of stones into the tree-houses; and as they are sometimes over one hundred feet high, and command the whole village, they are not easily taken. Travelling was not easy, as there were numerous streams to cross, and leeches were very plentiful in the wet grass. — (*Proc. roy. geogr. soc.*, v. 1883, 355.) W. M. D. [119

Indian surveys. — A general report on surveys in India during 1881-82, by Gen. J. T. Walker, announces the completion of the triangulation of all India on the lines long ago marked out by Col. Everest and sanctioned by the East India company. The latest part of this Great trigonometrical survey was the eastern frontier series of triangles extending from Assam to Tenasserim, where it was brought to a close on a base line of verification at Mergui. The topographical survey has continued its work in various parts of the peninsula, turning out maps on several scales embracing nearly twenty-five thousand square miles, besides forest and town surveys on large scales. A new survey of the Hoogly is begun, as the existing maps are out of date and on too small a scale for utility in so densely populated and valuable a region.

The chief geographic interest in the volume is found in the reports on trans-Himalayan explorations by trained native travellers, and in the reports of various executive officers of the survey on their districts. — (*Proc. roy. geogr. soc.*, v. 1883, 368.) W. M. D. [120

BOTANY.

Cryptogams.

New Ustilagineae. — Cornu gives an account of the anatomy and germination of the spores in several curious Ustilagineae. Ustilago axicola, Berk. and Curt., is made the type of a new genus, Cintractia, characterized by the formation of the spores in successive concentric circles. The curious Testicularia Cyperi from the United States is figured, and a second species of Leersia is described. The new genus Doassansia, in which the spore masses are surrounded by a peculiar envelope, has one representative from North America which is figured by Cornu. — (*Ann. sc. nat.*, xv. 269.) W. G. F. [121

Zygospores of Mucors. — Bainier has studied the conditions which favor the production of zygospores in Mucors, and finds that the conditions vary in the different species. The absence of free oxygen or of light is not a necessary condition, nor is a deficient supply of nourishment always required for the production of zygospores. Bainier cites a considerable number of cases where he has cultivated different species, and gives the manipulations required in each case for securing sporangia and zygospores; and he adds some observations on the chemical action of certain species. It appears that Phycomyces nitens, which usually grows on fatty substances, which it decomposes, can also be cultivated on cochineal, causing it to assume a deeper color, and rendering it more valuable commercially. Mucor racemosus, and a new species, M. tenuis, are described and illustrated in full. — (*Ann. sc. nat.*, xv. 342.) W. G. F. [122

Phenogams.

Lignification of epidermal membranes. — Besides cutinization, the change which characterizes epidermal cell-walls in general, the exposed wall may undergo two others: it may be converted into mucilage, thereby becoming weakened, or it may be rendered firm by the deposition or infiltration of mineral matters. To these well-known transformations of epidermal cells, Lemaire now adds *lignification*, hitherto supposed to be confined to internal tissues. For the detection of lignine, he uses the useful reagent suggested by Wiesner, phloroglucine. A section of epidermis is transferred from an alcoholic solution of the agent to hydrochloric acid, when the lignified membranes assume a rose color, the other parts re-

maining unchanged. For purposes of control, similar sections are first treated with either nitric acid or a solution of bleaching-powder, by which reagents, preferably the latter, the lignine is removed. Lemaire has detected lignine in the epidermal walls of Cycads, many Coniferae, and in the petiole of certain ferns. The stomata of gymnospermous plants have been found by him to always have the membranes somewhat lignified. — (*Ann. sc. nat.*, XV. 302.) G. L. G. [123

Mentzelia laevicaulis as a fly-catcher. — Marcus A. Jones of Salt Lake City, acting upon Dr. Gray's suggestion, examined this plant with the following interesting results: "the leaves are thickly beset with coarse hairs, which are furnished with several pairs of barbs pointing downward along them, while the top has an anchor-shaped summit twice as large as the other barbs. These hairs stand so close together that the barbs almost touch. Thickly studding the leaf, were many dead and dying mosquitoes, species of aphis, and other small insects. Some of these were caught by the head; but most of them were held by the proboscis, as their heads were too large to slip between the barbs. All were more or less mutilated, probably by other insects. A sweet fluid was secreted by the leaf, and this attracted the insects. There was no evidence of any digestion going on, as none of the victims could get close enough to the surface of the leaf to be touched by the fluid." — (*Bull. Torrey club*, June.) G. L. G. [124

Elongation of pedicels in Didymoplexis. — Hemsley calls attention to the elongation of the pedicels in these Asiatic orchids after fertilization, by which the ripening capsules are carried up above the decaying vegetable matter in which the plants grow. It is thus quite different from the elongation of the flower-stalks of Arachis and other plants which bury their ripening fruit. What its exact bearing on dissemination may be is not quite clear. — (*Journ. Linn. soc. bot.*, June 6.) W. T. [125

ZOÖLOGY.

Mollusks.

Mediterranean Mollusca. — Dr. J. Gwyn Jeffreys publishes a useful annotated list of species obtained near Crete by Admiral Spratt in seventy to a hundred and twenty fathoms. They are mostly quite minute. Ten new species are described and well figured. One, an extremely minute shell, which might well prove the fry of something larger, is globosely conical, imperforate, and with the pillar angulated and spread out at its base. It is referred to a new genus, Brugnonia, and placed in the Solaridae. A list of Ostracoda and Foraminifera, collected with the shells, is added by Mr. David Robertson. — (*Ann. mag. nat. hist.*, May.) W. H. D. [126

Structure of the shell in brachiopods and chitons. — Van Bemmelen has prepared an English abstract of that part of his Dutch paper which relates to the brachiopods. The principal points of the dissertation are also to be found in the *Jenaische zeitschrift*, ix. h. 1–2, 1883. That part relating to the chitons, which is the more interesting because in a fresher field, has not been made available for students who do not read Dutch. The paper is decidedly sophomorical, containing much that is important but not new, and a little that is new but not important, if we except the opinions of the author. The statement that there is any difference, except in degree, between the structure of the peduncle in Lingulidae and in other brachiopods, will require much more demonstration before it can hope to be accepted; and the principles upon which he includes the greater in the less by placing brachiopods among the chaetopods, would, if carried to their logical conclusion, include man among the Ascidians. — (*Ann. mag. nat. hist.*, May.) W. H. D. [127

Economic mollusks at the Fisheries exhibition. — The catalogue of the economic mollusks exhibited by the U. S. fish-commission at London, prepared by Lieut. Winslow, U.S.N., has just appeared, and forms a pamphlet of 85 pages, containing much information. — W. H. D. [128

VERTEBRATES.

Homologues of the parts of the temporal bones. — M. Lavocat, at the close of his revision of this subject, offers the following conclusions: —

1. That the relations of the squamosal and the zygomatic process in mammals show how ill applied to the oviparous vertebrates are the terms 'tympanic bone' (*os tympanique*), generally applied to the squamosal, and 'squamous portion of the temporal' (*écaille temporale*), given to the zygomatic process. In the oviparous vertebrates the tympanic bone does not exist. 2. That the zygomatic process, always included between the squamosal and the jugal, should never be confounded with the squamosal. 3. That there is a vulgar error relative to the temporal of serpents, in which the superior part of the squamosal has been considered to be the mastoid; while, in reality, the mastoid is invariably situated above or behind the auditory cavity, and is never movable. 4. That in birds the squamosal cannot be represented by the posterior frontal, because the latter is orbital in its relations, while the former is temporal; also that the zygomatic process should not be confounded with the jugal, the one having relations with the squamosal, the other with the maxillary.

The author also states concisely that that bone must be considered the squamosal which, though fixed or movable, is situated in front of the auditory canal, and articulates with the pterygoid and the mandible. In the oviparous vertebrates, the squamosal has commonly been wrongly designated 'the tympanic.' The zygomatic process, whether fixed or free, is always included between the squamosal and the malar. The parts of the temporal are also clearly distinguishable by their teleological relations.

The author furnishes the data for the table (see p. 114) of the synonymy of the temporal bone in the fishes and lower vertebrates. — (*Mem. acad. sc. Toulouse*, iv. 1882, 71.) F. W. T. [129

Nomenclature of the squamosal bone (temporal écailleux) of the Vertebrata pisciformes.

Lavocat.	Cuvier.	Owen.	St. Hilaire.	Agassiz.	Vogt.	Bojanus.	M.-Edwards.	Bakker.	Rosenthal.	Hallman.
Pièce supérieure.	Temporal.	Epitympanic.	Sérial.		Caisse tympanique.		Epitympanique.	Symplecticum primum.	Os carré.	
Pièce inférieure.	Jugal.	Hypotympanic.	Hypocotyléal.	Os carré.		Ptérygoïde interne.	Hypotympanique.	Symplecticum quartum.	[Carus.] Os discoideum.	
Pièce antérieure.	Tympanal.	Pretympanic.	Épicotyléal.	Caisse.			Pretympanique.			Ptérygoïde postérieure.
Pièce postérieure.	Symplectique.	Mesotympanic.	Uro-sérial.				Mesotympanique.	Symplecticum secundum.		[Meckel.] Styloïde.

ANTHROPOLOGY.

Domestication of the horse. — M. Cornevin, discussing the earliest evidence of taming the horse, very pertinently sets out with the question, "What is a domestic animal?" and replies, "One that participates in the *domus*, submits itself to the domination of a master, to whom it renders its products or its services, reproduces in captivity, and gives birth to young, which become more and more submissive to control." The idea of domestication comports with that of property in some form. M. Cornevin, for reasons mentioned in his communication, places the time of the event in the bronze age contemporaneous with the bronze bit. The fact seems incontestable that the use of bronze was imported into Europe and Africa from the orient. M. Pietrement, in his work on the origin of the domestic horse, and, before him, M. Pictet, in his *Origines indo-européennes*, have proved that the Aryans, of the central Asiatic plateau, utilized the horse at a time when Europe was in the stone age. In the discussion which followed M. Cornevin's paper, M. Faure remarked, that, while the bronze bit was good proof of the domestication of the horse, the latter may have been tamed long before bronze was known. Indeed, the Gauchos catch the wild horses with a simple lasso. Could not prehistoric man, after catching a horse by means of a lasso, like the Gauchos, have made a simple bridle of raw hide, and have managed the animal thereby? — (*Bull. soc. anthrop. Lyon*, i. 116.) J. W. P. [130

The troglodytes. — M. Alex. Bertrand, conservator of the museum of national antiquities of St. Germaine-en-Laye, delivered an address in December last on the cave-dwellers, now published with copious illustrations in the first part, vol. ii., of the *Revue d'ethnographie* (Jan.–Feb., 1883). The address is in popular language, and gives many valuable particulars, deduced from their remains, of the environment, habits, utensils, and art of the prehistoric inhabitants of Europe. Perhaps the most interesting points are the evidences presented of their domestication of the reindeer, and the parallel drawn between their supposed mode of life and that of the modern hyperboreans. — J. W. P. [131

The Serers of Joal and Portudal. — Dr. A. Corre of the French marine service gives an interesting and illustrated ethnographic sketch of the remarkable people on the west coast of Africa, chiefly near Cape Verd, and mentioned by Brue, towards the end of the seventeenth century, as being strongly distinguished from the surrounding negroes. In many particulars, these people show characteristics similar to those of tribes separated from them by half the circumference of the globe. A short sentence may be literally translated in illustration: "They call the uncle, father; the aunt, mother; the cousins, male and female, brothers and sisters." The writer of the sketch did not appear to understand, or at least to follow up, this evidence of the system of consanguinity and affinity so frequently found in the stage of savagery. — (*Rev. d'ethnographie*, Jan.–Feb., 1883.) J. W. P. [132

Roumanian ethnology. — Trajan conquered Dacia in A.D. 106, colonizing it with subjects drawn from various parts of the empire. When this same country became known to the inhabitants of western Europe, they found there a people speaking a language derived from the Latin, and evidently descended from Roman provincials. With their imperfect knowledge of the intervening centuries, it was but natural, says A. J. Patterson, that they should connect these facts together, and assume that the Wallachs of their own times were the direct descendants of Trajan's colonists, and that they had dwelt uninterruptedly on Dacian soil. As soon, however, as the Rouman language and Rouman institutions

were examined in detail, more and more points were discovered which could with difficulty be brought into harmony with that *prima facie* view. Inquirers who were not subject to the disturbing influence of Rouman patriotism came to the conclusion that the present Romance-speaking population of Roumania and Transylvania have migrated thither from the lands south of the Danube since the beginning of the twelfth century. In addition to the ordinary ethnologic evidence, the philological argument has been effectually urged by Paul Hunfalvy. Both in the middle ages and at the present time, a people is found in various parts of the Balkan peninsula whose speech so closely resembles that of the northern Roumans as to prove that they are dialects of one language, and must have been diffused from a common centre. — (*Academy*, May 19.) J. W. P. [133

NOTES AND NEWS.

It was known some months since how Mr. Henri Harrisse had made, as he claimed, a discovery that the Portuguese had as early as 1502 mapped out the eastern seaboard of the present United States from Florida to the neighborhood of 40° north latitude. A few weeks ago Mr. Harrisse laid a copy of the discovered map before the French institute with documentary proof of its date (1502). A more particular statement has reached us in a letter from the Rev. Edward E. Hale, written in Paris, where he had inspected Mr. Harrisse's copy of the map and document which were found in the archives of the Este family in Modena. We must await conclusive particulars, to be published by Mr. Harrisse, before determining if this last be one of the important contributions to the study of early American cartography, which this whilom New-York lawyer has made. Meanwhile it is not at all clear whether the new map is going to contribute any thing further than what we have already known from the old Portuguese chart, which Lelewel gives in his *Géographie du moyen âge*, pl. 43, with a conjectural date between 1501 and 1504. This gives a rude representation of Florida, with its easterly coast trending northerly, and coming abruptly to an end. Lying to the north-east, and in mid-ocean, is a bit of continental shore, indicating the Cortereal discoveries in its latinized name, 'Regalis domus,' with a large island adjacent called 'Terra laboratorum,' or Labrador. The earliest printed map of this region bears a strong resemblance to the Portuguese chart, and would seem to have been based on the same or similar information; and this is the famous Stobnicza map, which was published at Cracow not far from 1512. The 1511 Ptolemy has the Cortereal region, but omits Florida. From two maps in the 1513 Ptolemy a delineation very like the Portuguese chart can be made up; and after this its contours became for some years an established type frequently met with. Another Portuguese chart is well known to students in this field; and that is the one which has been reproduced by Stevens, Kunstmann, Kohl, and others, and is usually placed between 1514 and 1520. If it embodied current knowledge in Portugal, it was certainly not generally known there that the eastern coast united with the Cortereal region; for the ocean is represented as washing uninterruptedly between.

From what Mr. Hale writes, the newly found map would seem to be much the same in character as the 1513 printed Ptolemy maps, thus carrying back their delineation ten or eleven years earlier; and this, we have seen, takes us to the supposed date (1501–1504) of the Lelewel Portuguese chart, which is essentially like the 1513 maps, and seemingly like the Este map: but a sight of Harrisse's discovered chart, in due time to reach us, will give us something more than conjecture on which to base an estimate of its importance.

There is one discovery, however, which we are waiting for, and in time it may come; that is, the evidence, cartographical we hope, rather than documentary, that the Biscayan fisherman knew the Grand Banks and the adjacent coasts long before Columbus. It seems harder not to believe that this was the case than to believe it. The hardy fishermen of the Bay of Biscay had stretched their courses farther and farther to the north in pursuit of the stock-fish or cod, which was the staple food of Catholic Europe for more than a hundred days in the year. They had gone to Iceland, and, by easy gradation, to the Greenland seas; and we must remember that on this very Portuguese chart of 1501–1504, and in the Ptolemy, preceding the time of Columbus, Greenland was but a prolongation of north-western Europe. Accordingly, following their game, the fishermen could easily have cruised still farther along the Labrador coast, and to the neighborhood of Newfoundland, without in the least supposing they had found a new world, but rather a hitherto unvisited region of the old world. So, on their return, their sailor's yarns would raise no suspicion of a new quarter of the globe, such as Europe was startled at when Columbus returned from his purposed quest. It was not the fishermen's report, accordingly, that could have incited Cabot; but, when news reached England of the discovery of the Spaniards, it can easily be conceived how these sailor's yarns may have been interpreted in the belief that the land found by Columbus must, by the analogy of continents, have stretched to the north, and could be found by sailing west from England. Further, so far as Columbus' views were shared, that he had reached the coast of Asia, the reports of Marco Polo and the rest showed that the Asian coast must lie also in that very direction. Now, when Cabot reached the land, and found the natives calling the stock-fish or cod, *baccalaos*, where did they get the very term which Biscayan fishermen had applied to the same fish for centuries? This has always been a puzzle. It seems to us that it will yet be discovered that Cabot had only reached by a southern passage the region which the Biscayans had long been sailing to by the northern. The archives of Europe, we are confident, will yet reveal the proof. Only last summer the Rev. Mr. Hale, searching the archives at Madrid, found a sketch by Cortes